CLAIMS

What is claimed is:

1. A magnetic head having an air bearing surface (ABS), comprising:
a magnetomechanically active structure; and
a coil coupled to the magnetomechanically active structure, the magnetomechanically active structure responding to a magnetic field generated by the coil to expand and/or contract.

2. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure is generally toroid shaped.

3. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure includes at least two layers.

4. A magnetic head as recited in claim 1, wherein a magnetization of the magnetomechanically active structure is set parallel to the ABS, the magnetomechanically active structure inducing protrusion of the head into the ABS in response to the magnetic field generated by the coil.

5. A magnetic head as recited in claim 1, wherein a magnetization of the magnetomechanically active structure is set at an angle between about 0 and about

90 degrees with respect to the ABS, the magnetomechanically active structure inducing protrusion of the head towards the ABS in response to the magnetic field generated by the coil when current is passed through the coil in a first direction, the magnetomechanically active structure inducing contraction of the head away from the ABS in response to the magnetic field generated by the coil when current is passed through the coil in a second direction opposite the first direction.

6. A magnetic head as recited in claim 5, wherein a magnetization of the magnetomechanically active structure is set at an angle between about 30 and about 60 degrees with respect to the ABS, the magnetomechanically active structure inducing protrusion of the head towards the ABS in response to the magnetic field generated by the coil when current is passed through the coil in a first direction, the magnetomechanically active structure inducing contraction of the head away from the ABS in response to the magnetic field generated by the coil when current is passed through the coil in a second direction opposite the first direction.

7. A magnetic head as recited in claim 1, wherein a portion of the magnetomechanically active structure positioned away from the ABS is anchored.

8. A magnetic head as recited in claim 7, further comprising a first material for anchoring the portion of the magnetomechanically active structure positioned away from the ABS, and a second material coupled to the magnetomechanically

active structure towards the ABS, the second material having a lower Young's modulus than the first material.

9. A magnetic head as recited in claim 8, further comprising a third material positioned between the magnetomechanically active structure and the second material, the third material having a coefficient of thermal expansion similar to that of the second material.

10. A magnetic head as recited in claim 7, further comprising a first material for anchoring the portion of the magnetomechanically active structure positioned away from the ABS, and a second material coupled to the magnetomechanically active structure away from the ABS, the second material having a lower Young's modulus than the first material.

11. A magnetic head as recited in claim 10, further comprising a third material positioned between the magnetomechanically active structure and the second material, the third material having a coefficient of thermal expansion similar to that of the second material.

12. A magnetic head as recited in claim 1, further comprising a layer of material coupled to the magnetomechanically active structure, the third material having a coefficient of thermal expansion similar to that of a material of the head operatively coupled thereto.

13. A magnetic head as recited in claim 1, further comprising a layer of material on an opposite side of at least one of a read element and a write element with respect to the ABS, the layer of material having a Young's modulus lower than a majority of materials surrounding the layer of material.

14. A magnetic head as recited in claim 13, further comprising second and third layers of material extending from the layer of material towards the ABS, the second and third layers of material having a Young's modulus lower than a majority of materials surrounding the second and third layers of material.

15. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure is positioned between a read element and a write element of the head.

16. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure is positioned on an opposite side of a read element of the head with respect to a write element of the head.

17. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure is positioned on an opposite side of a write element of the head with respect to a read element of the head.

18. A magnetic head as recited in claim 1, wherein the magnetomechanically active structure contracts upon detection of a thermal asperity on the disk surface.

19. A slider having a magnetic head, the magnetic head having an air bearing surface (ABS), the slider comprising:
a magnetomechanically active structure; and
a coil coupled to the magnetomechanically active structure, the magnetomechanically active structure responding to a magnetic field generated by the coil to expand and/or contract.

20. A magnetic storage system, comprising:
magnetic media;
at least one head for reading from and writing to the magnetic media, each head comprising:
a magnetomechanically active structure; and
a coil coupled to the magnetomechanically active structure, the magnetomechanically active structure responding to a magnetic field generated by the coil to expand and/or contract;
a slider for supporting the head; and
a control unit coupled to the head for controlling operation of the head.

21. A magnetic storage system as recited in claim 20, further comprising a thermal asperity detector coupled to the at least one head, wherein the

magnetomechanically active structure of the head contracts upon detection of a thermal asperity on the disk surface.